**Syllabus for Level II for Syllabus for JT – Central Instrumentation Facility**
**(Advt. No. IITPKD/R/NF/01/2021 Dated 03 Feb 2021)**

**Duration : 90 minutes**
**Marks: 100**
**Type of Question paper: MCQs & Short Answer Type questions**

## Analog Electronics

1. Voltage and current sources: independent, dependent, ideal and practical; v-i relationships of resistor, inductor, and capacitor; transient analysis of RLC circuits with dc excitation.
2. Kirchoff's laws, mesh and nodal analysis, superposition, Thevenin, Norton, maximum power transfer and reciprocity theorems.
3. Peak-, average- and rms values of ac quantities; apparent-, active- and reactive powers
4. Characteristics and applications of diodes, Zener diode, BJT
5. Applications of op-amps: difference amplifier, adder, subtractor, integrator, differentiator, instrumentation amplifier, precision rectifier, active filters and oscillator circuits.

## Measurements

1. SI units, systematic and random errors in measurement, expression of uncertainty - accuracy and precision, propagation of errors.
2. Measurement of voltage, current and power in single and three phase circuits
3. True rms meters
4. Digital voltmeter, digital multimeter
5. Oscilloscope
6. Shielding and grounding
7. Digital to Analog converters and Analog to Digital Converters

## Sensors and Scientific Instrumentation

1. Resistive, capacitive, inductive sensors and associated signal conditioning circuits
2. Temperature measurement (thermocouple, RTD (3/4 wire), thermistor )
3. Light intensity measurement (LDR, photodiode, phototransistor)
4. Strain gauges
5. Pressure gauges and valves

## Basic Physics

### Units and Dimensions

1. Basics of Ohm's law, drift velocity, mobility
2. Two terminal and four terminal I-V measurements, advantages and disadvantages, van der Pauw method.
3. Bragg's law and its applications, X-ray generation

## General Skills

1. Official Letter writing, Basic Computer knowledge